Jew

CS-03-023

MAY 0 6 2004 PA

April 30, 2004

To: Commissioner for Patents

P.O.Box 1450

Alexandria, VA 22313-1450

Fr: George O. Saile, Reg. No. 19,572

28 Davis Avenue

Poughkeepsie, N.Y. 12603

Subject:

Serial No. 10/776,793 02/11/04

Indrajit Manna et al.

TRIGGERED SILICON CONTROLLED RECTIFIER FOR RF ESD PROTECTION

INFORMATION DISCLOSURE STATEMENT

Enclosed is Form PTO-1449, Information Disclosure Citation In An Application.

The following Patents and/or Publications are submitted to comply with the duty of disclosure under CFR 1.97-1.99 and 37 CFR 1.56.

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on May \checkmark , 2004.

Stephen B. Ackerman, Reg.# 37761

Signature/Date

- U.S. Patent Application Publication US 2003/0016479 A1 to Song, "Electrostatic Discharge (ESD) Protection Circuit of Silicon-Controlled Rectifier (SCR) Structure Operable at a Low Trigger Voltage," describes an ESD protection circuit having silicon-controlled rectifier structure that includes a PNP transistor and an NPN transistor.
- U.S. Patent 6,605,493 to Yu, "Silicon Controlled Rectifier ESD Structures with Trench Isolation," teaches about an SCR ESD protection device used with shallow trench isolation structures.
- U.S. Patent 6,580,184 to Song, "Electrostatic Discharge (ESD) Protection Circuit of Silicon-Controlled Rectifier (SCR) Structure Operable at a Low Trigger Voltage," illustrates an ESD protection circuit having a silicon-controlled rectifier structure.
- U.S. Patent 6,534,834 to Ashton et al., "Polysilicon Bounded Snapback Device," teaches about a snapback device that functions as a semiconductor protection circuit to prevent damage to integrated circuits resulting from events such as electrostatic discharage.

- U.S. Patent 6,610,262 to Peng et al., "Depletion Mode SCR for Low Capacitance ESD Input Protection," describes an ESD semiconductor protection with reduced input capacitance.
- U.S. Patent 5,453,384 to Chatterjee, "Method of Making a Silicon Controlled Rectifier Device for Electrostatic Discharge Protection," describes a silicon controlled rectifier structure that is provided for electrostatic discharge protection.
- U.S. Patent 5,159,518 to Roy, "Input Protection Circuit for CMOS Devices," details an input protection circuit that protects MOS semiconductor circuits from electrostatic discharge voltages and from developing circuit latchup.
- U.S. Patent 5,629,544 to Voldman et al., "Semiconductor Diode with Silicide Films and Trench Isolation," discusses a structure for improving device characteristics of protection diodes on chips having trench isolation and silicide contacts.

Voldman et al., "Electrostatic Discharge (ESD) Protection in Silicon-on-Insulator (SOI) CMOS Technology with Aluminum and Copper Interconnects in Advanced Microprocessor Semiconductor Chips," EOS/ESD Symposium 99-105, pp. 2A.6.1 to 2A.6.11, discusses the electrostatic discharge (ESD) robustness of silicon-on-insulator (SOI) high-pin-count high-performance semiconductor chips.

CS-03-023

Voldman et al., "Semiconductor Process and Structural Optimization of Shallow Trench Isolation-Defined and Polysilicon-Bound Source/Drain Diodes for ESD Networks," EOS/ESD Symposium 98-151, pp. 3A.1.1 to 3A.1.10, discusses the impact of MOSFET source/drain junction scaling on ESD robustness of shallow trench isolation (STI)-defined diode structures, ESD robustness improvements to STI-bound p+ diodes using germanium preamorphization and deep B11 implants, and polysilicon-bordered ESD networks.

Sharma et al., "An ESD Protection Scheme for Deep Submicron ULSI Circuits," 1995 Symposium on VLSI Technology Digest of Technical Papers, pp. 85-86, describes a scheme for on-chip protection of sub-micron ULSI circuits against ESD stress using low voltage zener-triggered SCR, and a zener-triggered thin gate oxide MOSFET.

Sincerely,

Stephen B. Ackerman,

Reg. No. 37761

																					_0: <u>T</u>	<u> </u>	
Form PTO-1	44!	9												1	ار بر ارد مسالید ارد	•				CHON HUMON			
INFORMATION DISCLOSURE CITATION																10	10/776,793						
OTAE									TION		,,,,,	011		Yttaca		ndr	aj	<u>i+</u>	M	anna	et	al.	
MAY 0 6 200	4108	١)V0	/al :	sho	uls i	Ino	x o s s s	vy)					FHAG	0.40 O.	al ii	104	:	a	ואל דג פטכ			
	S.	<u> </u>									U. S	s'. P/	YTE	ם דא	ocu	MEN:	TS	· · · · · · · · · · · · · · · · · · ·					
S. THINEBINED	00	œυ	u E	ו זא	HUL	400	л	ره	π.					HULL				CUL		Mecrie	አ	אס פא אס פא	ULTE
····	6	<u>م</u>	1	0	2	6	2	8/	26/0	3_	Pe	ma	e	士	al.			42	3	197	_31	4	02
:	6	6	0	5	4	9	3	8/	140	3	Yu							438	8	135	8/	/9د	01
	ھا	5	8	0	L	8	4	6	17/0	3	5	M	3 —	·.				30-	7_	112	5/	16/	02
	6	5	3	4	8	3	4	3	8/0:	3	As	thi	0 V	1 e	+	مل		25	7	3 <i>55</i>	12	119	01
·.	5	l	5	9	5	L	8	6	27/9	2	R	مع						36		56	4	ורו	90
	5	6	<u>ء</u>	9	5	4	4	5	3/9-	7		old	lm	an	e	- a	<u>l. </u>	25	7_	355	41	25	195
	5	4	5	3	3	8	4	9/2	6/9	5	CI	na	+	ter	je,	و		43	7	6	31	25	194
											-												
			_			Γ				-						····			-,,-		•		
							_					:										-	
	L	l	ــــنا	<u> </u>	ل	ــــــــــــــــــــــــــــــــــــــ	!	1		FC	RE	IGN	PA.	TENT	DOC	CUME	ENTS		,,	<u> </u>	L	· ·	
	∞	:UL	ĊH	TH	UN	ופת		a	TE				COU	YNTN	·····			CLUS	5	SUBCLASS		ullen	
		_					\dashv			-		:				-,					YES		100
<u></u>		-	\dashv		-		-			-												+-	
										-									_		·	+	 -
	_	-	-	-		-				-						 						_	
		_	-		_	_	_			_												-	
					_											· · · · ·							
	- 1			_						07	THE	R D	oct	JMEI	VTS	(Indud	መ አመ	nor, Tivo	. Da	la, Partinorx F	1003, 8	Elc.)	
1		Ц	S	P	<u>له</u>	te	<u>.</u> 4	F	160	P		٠.			•	1 6 1		Al	·· -	to Son	<u>19,</u>		·····
		<i>b</i>	ليا	. ط	\mathcal{L}	تملا	£	<u>e_</u>	1/2	<u>3/0</u>	3,	E	1:	ed	5	16/0	o2,	US		1.36	15	٠ ط	
-	_	<u>S</u>	<u>ا.</u>	ال	1	d	~	an	ت	Ł	لم	" ''	El	ect	ros	tat	زد	Dis	ch	arge!	(ES	(0	
		P	رو	+	<u>e</u>	+	<u>`</u> 0	m	in	<u> </u>	<u> </u>	<u>`co</u>	<u>~</u> -	on	<u>-I</u>	nsu	lat.	<u>√ (</u>	<u>o 2</u>	I) CM	201		
			\ e	حا	<u>^</u>	مِب	-la	وم د	ر س	it	h	Al.	Lm	يكي	Lm_	an	d C	albor	. 7	ps", E	nei	4	in
		<	b	ال سم	an On	ر. د د	و سا	t m	1Mi 90	cv	105 105	οςς	or 2 f	ع5 . ما. إ	mic l +	ondi o 2	2A.	6-11	h.	ps, E	O > /	ESD	
EXAMPLE			7			<u> </u>						,		DATE	ONKO								
·																				,			

Form PTO-1	449				Doctors Humber (Openner)		Africans Homen			
ואוברום	וגחודגענ	DISCL	OCHDE (HOITATION	CS-03-02	13	10/770	,793		
וואויטרי			CATION		Lyxeni Indr	aiit	Manna	at.		
					FMod Date	,	Croup Lr Uni			
	(Uso sovoral	300013 11 00	C0333/y)		1	04				
	<u></u>		· · · · · · · · · · · · · · · · · · ·	U.S. PATE	ENT DOCUMENTS					
MUNT EXMINEU	DOCUMENT	HOUBER	DATE	·	ועשנ	CUII	Mecra	א איירוס טאדנ א איירוס טאדנ		
			<u> </u>							
		1.					-			
	 - -	- - -					_			
···										
	 - - - -	+	·				_			
·			·							
					····					
				,						
	·}									
		1 1 1	I							
					·			 		
·				50051011 81	TOUT DO OLUMNI					
				FOREIGN PA	TENT DOCUMEN	ITS				
	DOCUMENT N	MADEN	CUTE		TENT DOCUMEN	ITS cuss	SUBCLASS	Translatio YES	20	
	DOCULENT N	NOTE OF THE PROPERTY OF THE PR					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	DOCULENT IN	MAREN					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	OCCURENT IN	MINDEN					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	DOCUMENT)	MINDEN					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	DOCULENT)	KUNBEU					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	OCCUPENT !	MARCA					SUBCLASS	· · · · · · · · · · · · · · · · · · ·		
	DOCULENT I	MINDEN		ca		cuss		YES	Ю	
	DOCUMENT)	WILDER J		OTHER DOC	UMENTS (Including	CUSS	Dato, Portinors	YES	Ю	
	S.Vo	NUMBER Id ma		OTHER DOC	UMENTS (Induding	CUSS Autror, Tivo,	Date, Pertinorx	YES	Ю	
	S.Vo Opt:	Idma		OTHER DOC	UMENTS (Including	cuss Author, Tile, rocess olation	Date, Pertinorx	Pagos, Eic.)	ral L	
	S.Vo Opt: Poly:	ld ma miza silica	n et tion,	OTHER DOC al. "Semi of Shallo and Source	UMENTS (Induand) (conductor P w Trench Is e/Drain D	cuss Lunor, Mu, rocess olation lodes	Date, Pertinorx	YES	ral L	
	S.Vo Opt: Poly:	ld ma miza silica	n et tion,	OTHER DOC al. "Semi of Shallo and Source	UMENTS (Induand) (conductor P w Trench Is e/Drain D	cuss Lunor, Mu, rocess olation lodes	Date, Pertinorx	Pagos, Ec.,	ral L	
	S.Vo Opt: Poly: Eos/	ld ma miza silica ESD	n et tion, m-Bo	OTHER DOC al. "Semi of Shallo and Source osium 95	UMENTS (Induding aconductor P w Trench Is e/Drain D 8-151, 3A-1	cuss Lutinor, Tivo, rocess olation indes	Dalo, Portinors. and StDefine for ESD. 3A.1.	Pagos, Elc.) Tructus Nota	ral L	
	S.Vo Opt: Poly: Eos/	Id ma miza silica /ESD	n et tion, m-Bo Symp	OTHER DOC al., "Semi of Shallo and Source orium 95 et al., "A	UMENTS (Including econductor P w Trench Is e/Drain D 8-151, 3A-1	cuss Luttor, Mu, rocess olation iodes iodes	Date, Porthorx, and StDefine for ESD 3A.I. reme for	Pagos, EIC.) ructus Meta 10. Deeg	ral L vorks	
	S.Vo Opt: Poly: Eos/	Id ma miza silica /ESD	n et tion, m-Bo Symp	OTHER DOC al., "Semi of Shallo and Source orium 95 et al., "A	UMENTS Undudos aconductor P w Trench Is e/Drain D 8-151, 3A.1 In ESD Protect g. on ULSI	cuss Luttor, Mu, rocess olation iodes iodes	Date, Porthorx, and StDefine for ESD 3A.I. reme for	Pagos, EIC.) ructus Meta 10. Deeg	ral L	
EX. Number	S.Vo Opt: Poly: Eos/	Id ma miza silica /ESD	n et tion, m-Bo Symp	OTHER DOC al., "Semi of Shallo and Source orium 95 et al., "A	UMENTS (Including econductor P w Trench Is e/Drain D 8-151, 3A-1	cuss Luttor, Mu, rocess olation iodes iodes	Date, Porthorx, and StDefine for ESD 3A.I. reme for	Pagos, EIC.) ructus Meta 10. Deeg	ral L vorks	